

## SHORT REPORT

# Duplication of Superficial Femoral and Popliteal Artery (A Previously Undescribed Variant)

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### Introduction

There exist different therapeutic approaches to a patient admitted to the hospital with acute lower limb ischemia. When surgical treatment is the method of choice, a detailed knowledge of lower limb anatomy is essential in order to achieve a successful outcome. Although encountered rarely, an anatomic variation of the vessels might be troublesome for the surgeon. We present a 97-year-old woman with acute limb ischemia and duplication of the superficial femoral and the popliteal artery. This variant has never previously been described.

### Case Report

A 97-year-old female patient was admitted to the emergency department with right lower limb pain, loss of motor function and pallor of 10 h duration. Physical examination revealed bilateral palpable femoral pulses. In the right limb the popliteal and distal pulses were not palpable. The ankle-brachial pressure index (ABPI) was 0. On the left side the popliteal pulse was palpable but the distal pulses were not, and the ABPI was 0.5. Laboratory tests revealed anemia (haematocrit 26%). The ECG showed atrial fibrillation. Intravenous digitalis treatment was started. With an

initial diagnosis of lower limb ischemia due to acute thromboembolism, a right femoral artery exploration and thromboembolectomy was planned. Under supportive medical treatment, exploration of the common femoral artery (CFA), superficial femoral artery (SFA) and deep femoral artery was carried out under local anaesthesia. Exploration of the femoral vessels showed the superficial arteries to be duplicated distal to the common femoral bifurcation. The profunda was not duplicated. Both superficial femoral arteries were catheterised with 4F and 5F Fogarty catheters and embolectomy resulted in satisfactory backflow. Thromboembolectomy of the proximal artery produced emboli and pulsatile flow ensued.

After the procedure, the popliteal pulse was palpable and completion on-the-table angiography showed that the superficial femoral artery and the popliteal artery were duplicated to below the knee (Fig. 1). Due to technical difficulties the runoff could not be demonstrated. After surgical intervention, distal pulses were not palpable but the right lower limb became warm and motor function returned. Postoperative ABPI on the affected site was 0.6. Low molecular weight heparin (1 mg/kg Enoxaparine) was used in the postoperative period. On the 3rd day, the serum creatinine level increased to 2.7 mg/dl with total daily urine output of 400 cc. The renal failure and increasing respiratory problems were thought to be due to reperfusion damage. On the fifth day, under fluid-electrolyte and frusemide treatment, the creatinine level fell to 1.2 mg/dl with a daily urine output of 1000 cc. On the 6th day of admission, the patient complained of chest pain and dyspnea, which were

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Fig. 1. Completion angiography following embolectomy.

suggestive of an acute myocardial infarction confirmed by enzymatic and electrocardiographic findings. The patient was admitted to ICU but despite resuscitative efforts died from cardiac failure.

### Discussion

Thromboembolectomy in selected cases of acute limb ischaemia is a procedure that not only salvages the limb but also a safe one when performed under local anaesthesia. Minor anatomic variations of the thigh arteries are usually quite easy to deal with. However major variations may cause serious problems during dissection. Hence every surgeon should be aware of possible anatomical variants.

Three common variations in the thigh arteries are aplasia or hypoplasia of the superficial femoral artery

with a persistent sciatic artery (which normally regresses with growth), duplication of the superficial femoral artery and duplication or hypoplasia of the deep femoral artery with well-developed collaterals.<sup>1</sup> Cases are reported in which the femoral artery divides into two trunks below the origin of the profunda, and become reunited near the adductor hiatus to form a single popliteal artery.<sup>2,3</sup> However in this patient angiography revealed that the popliteal artery was duplicated as well as the superficial femoral artery (Fig. 1).

Duplication of the popliteal artery is seldom reported in the literature. Allimant *et al.* reported an exceptional double popliteal artery, which was a surprise finding.<sup>4</sup> However one of the duplicated popliteal arteries was accepted to be a persistent sciatic artery after other possible embryological variants were ruled out. Sciatic artery originates from the internal iliac artery and is usually accompanied by a hypoplastic superficial femoral artery.<sup>5</sup> In this case, the superficial artery is duplicated and the arteries do not reunite near the adductor hiatus to form one popliteal artery, but generate two popliteal arteries as well. Further investigations such as duplex ultrasound could not be carried out because of the patient's deterioration. The on-the-table angiogram performed after embolectomy is the only available image.

It should be stressed that a clear awareness of possible anatomical variations of the thigh and the popliteal vessels is as essential as a meticulous dissection in achieving a satisfactory outcome.

### References

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